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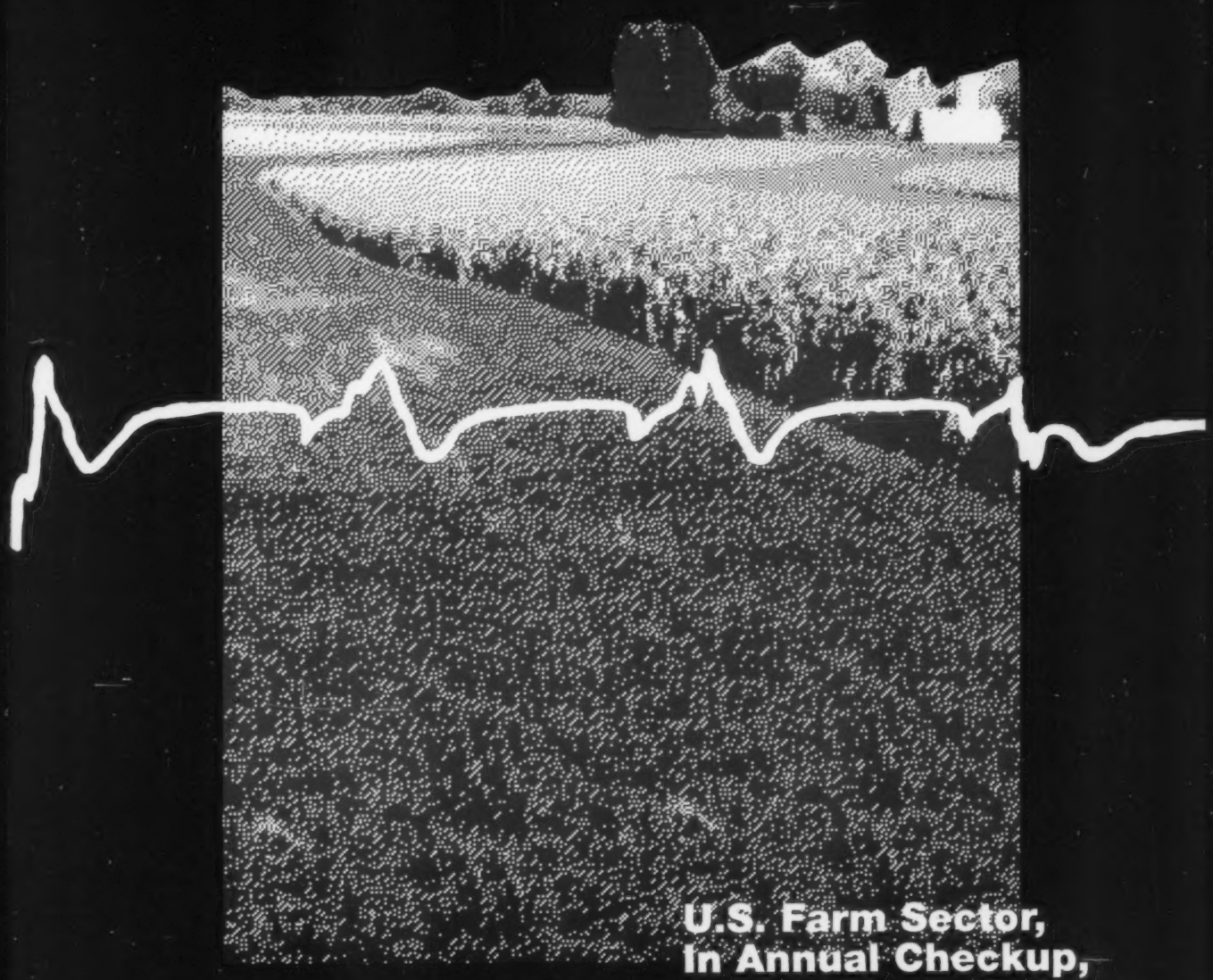

U.S. Farm Sector, In Annual Checkup, Shows Strong Pulse

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PERSPECTIVES

U.S. farm income is expected to be near a record high level in 1991. Cash receipts will rise, with larger marketings. Higher prices are in prospect for some commodities. But production expenses will increase 3 to 6 percent, mainly reflecting higher prices for energy-related inputs. Cash farm income should total $55-60 billion, compared with the 1990 record high of $59 billion. (The information in this column is from presentations at USDA's Annual Agricultural Outlook Conference a few weeks ago.)

U.S. consumers should see retail food prices rise by 2 to 5 percent in 1991, after a gain of about 6 percent in 1990. Expected record meat supplies, higher dairy product output, and bigger citrus crops will moderate food price rises. Marketing costs will increase less if overall inflation eases, as projected, to around 4.5 percent from 5.5 to 6 percent for 1990.

World consumption of farm products is expected to show at least modest gains for most commodities in 1991, responding to real economic growth of about 2 percent, meat output 2 percent larger, and population up 1.7 percent. These factors will strengthen the demand for agricultural products, but shorter supplies are limiting use of a few commodities, particularly cotton.

Grains will be the big news in 1991. Production shot ahead in 1990, after three years during which world consumption of grains exceeded production, working down stocks. Grain consumption should rise by another 2 percent in 1991, but production is likely to be up 5 percent to a new record. Prospective stocks in relation to use will remain below average at 18 percent.

World trade in wheat in 1990/91 will be smaller because of bigger crops in importing countries and stocks will rise. Consumption will increase sharply, but ending stocks also will be up because of record production. Stocks still will be well below the levels of the mid-1980's, however. A near-record U.S. wheat crop is expected in 1990/91, as well as lower carryin stocks, smaller exports, and larger domestic use. World wheat trade in 1989/90 was largely unchanged from a year earlier and, despite the lowest prices in many years, a small decline is expected in 1990/91.

The world coarse grain situation for 1990/91 is highlighted by larger production but a further decline in stocks, especially in the United States. Trade will slip from the relatively high 1989/90 level. Smaller expected imports by the USSR, Mexico, Japan, and several other countries would result in a reduction of about 10 percent in world trade. U.S. exports are forecast down more than 15 percent, led by a drop in corn.

About 60 million acres were set aside from production by U.S. farmers in 1990, slightly below the 1989 level—but planted acreage was down 1 percent. Some of the 24 million acres in annual set-aside could be brought back into production this year if acreage reduction requirements for program participation are lowered for cotton from the 12.5 percent for 1990 and for feed grains from the 10 percent in effect last year. But the set-aside for wheat will be up sharply from the 5 percent for 1990. The "mix" of acreage planted for 1991 crops will shift in response to greater flexibility under the new farm bill (FACT—the Food, Agriculture, Conservation, and Trade Act) and the Budget Reconciliation Act. Producers will be allowed to plant a variety of crops, not including fruits and vegetables, on up to 25 percent of their crop acreage base.

— Jack Harrison

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FEATURES

U.S. Farm Sector, in Annual Checkup, Shows Strong Pulse *by Jack Harrison* **2**

Farm Costs and Returns Survey data show that the U.S. farm sector gained strength financially during 1989. Some parts of U.S. agriculture, however, continued to struggle with hard times. The next survey, covering 1990, will begin in February and continue for about 6 weeks.

Poland Struggles to Transform Economy *by Carol Lee Morgan* **8**

Poland's agriculture was relatively inefficient during more than forty years of Communist rule, despite a tradition of excellence in several areas. Now, the Nation is striving to create a free market economy. The shock of drastic changes is shaking the farm sector to its roots, but improvements are already evident.

New Crops, and Old, Offer Alternative Opportunities *by Priscilla Glynn* **12**

New crops, and new uses for old crops, can provide several advantages: raise farm income, cut Government program costs, reduce excessive supplies, improve our Nation's balance of trade, and help protect the environment. ERS economists are looking into a number of such alternatives.

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U.S. Farm Sector, In Annual Checkup, Shows Strong Pulse

U.S. agriculture, in its most recent annual checkup, was found to be hale and hearty—although with a few problems needing attention.

USDA has been "taking the pulse" of the Nation's agricultural sector, using the Farm Costs and Returns Survey (FCRS), for 6 years. The seventh exam is coming up soon. The most recent year covered—1989—was financially the best of the 6, according to economist Mitch Morehart of USDA's Economic Research Service.

Most segments of U.S. agriculture, in most regions of the country, gained financial strength in 1989, continuing the recovery from the hard times of the early and mid-1980's.

"However, some farmers still had serious financial problems in 1989," Morehart says.

The survey covering the financial conditions of 1990 will begin in mid-February 1991 and continue for 6 weeks. About 24,000 farmers and ranchers in the 48 contiguous states will be contacted by enumerators.

The number of farms with high debt continued to decline in 1989.

Information from the survey is used by lawmakers, other government officials, farmers and ranchers, farm organizations, and many others in setting policies or making a wide variety of decisions on an individual or a group basis.

"The survey tells us how much it costs to produce various commodities in different areas and helps us maintain a good understanding of the financial strengths and weaknesses of U.S. agriculture," Morehart says.

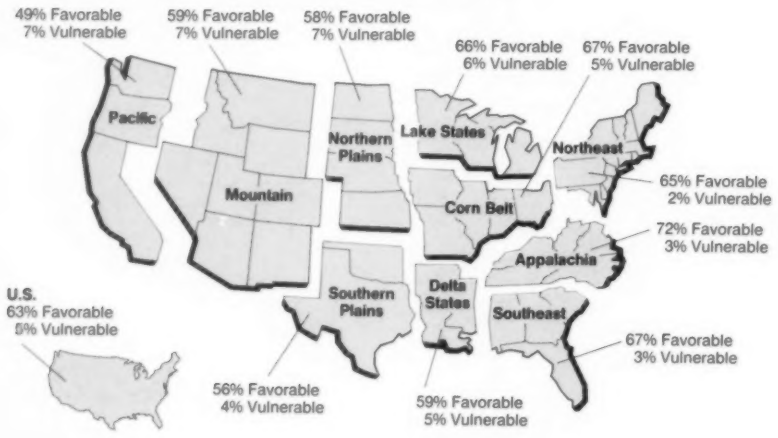
Some highlights of the last survey:

- Positive net farm income was reported by 69 percent of farms in 1989, compared with 64 percent in 1988.
- Farm assets averaged $404,209 per farm in 1989, up from $359,575 in 1988. Average net worth per farm was $356,191, compared with $311,343 in 1988.
- Farm operator debt was basically unchanged, on average, at $48,018 per farm in 1989.
- The number of farms with high debt continued to decline—to 11 percent with debt/asset ratios above 0.40 at the end of 1989. And 48 percent of farms had no debt.
- Debt/asset ratios fell from 0.13 to 0.12 in 1989 for all farms and from 0.17 to 0.15 for farms with annual gross sales of $40,000 or more. This was a continuation of the downward trend that began in 1987.
- The Northern Plains, Mountain, and Pacific regions (see map on this page) had the highest proportions of financially vulnerable farms in 1989.
- The percentage of farms classified in a financially vulnerable position declined in 1989 for all sizes of farms, regions, and production specialties.

The largest 1989 increases in the percentage of profitable farms occurred in the Lake States, Corn Belt, Northeast, and Appalachia regions. Dairy and tobacco operations led all production specialties with 85 percent earning positive net farm incomes.

Average net farm incomes increased for all production specialties in 1989. Farm operations specializing in cotton, nursery-greenhouse products, and poultry had the highest net farm incomes in both 1988 and 1989. The largest gains, in percentage terms, occurred for cotton and dairy farms.

The Northern Plains, Mountain, and Pacific Regions Had the Largest Portions of Financially Vulnerable Farms in 1989*



*From the 1989 Farm Costs and Returns Survey.
Farms in favorable condition have both positive income and low debt; those rated vulnerable have negative income and high debt.

Survey Information Is Utilized Widely

The information collected in the Farm Costs and Returns Survey helps agricultural economists and government officials do their jobs better.

But the major benefactors of the annual survey are the Nation's farmers and ranchers themselves.

"The only source of information about what it costs farmers to produce the Nation's food and fiber is the farmers themselves," says economist Jim Johnson, who heads the ERS team that analyzes the survey results each year.

"The survey also tells us how Government farm programs are working and how they might need to be changed," Johnson adds.

"USDA collects the information, organizes it, analyzes it, checks its reliability, and makes it widely available," he notes.

Tennessee State statistician Ron Brantner has been involved in the FCRS and other information-gathering projects for many years.

"It's very helpful to have this detailed, composite-type information about agriculture—which is what the FCRS provides us," he says.

"Tennessee's agricultural sector is very diverse and includes many small farms," he says. "The FCRS is an excellent way for us to keep informed about how the small farms are doing, which is more difficult than monitoring the condition of the large farms.

"FCRS information is among the most sought-after types of data we have available at our State office," Brantner says. Farm and commodity organizations, educational institutions, and the media are among those frequently requesting FCRS data, he says.

Brantner adds that the survey is being constantly evaluated to make sure it stays up to date as changes occur in U.S. agriculture.

Dr. B.F. (Bud) Stanton, an agricultural economist at Cornell University in Ithaca, New York, has worked with USDA personnel for 5 years on statistical analysis of FCRS data and on the survey methods.

"FCRS is the only survey of U.S. farming activity that is conducted on a consistent basis in the various States," Stanton says. He notes that many States have their own information-gathering activities, but the FCRS is unique and of special importance because it is conducted nationwide.

"It is a large enough survey that we can be confident of its accuracy. It allows comparisions between years, between States, and between farms," Stanton says.

"And it is the only survey that provides a window on what is happening with individual farm operations in this country."

"We need to keep this survey alive, well, and healthy, because it's of vital importance in providing information to analysts about U.S. agriculture," Stanton says.

Sammye Crawford, a survey statistician with USDA's National Agricultural Statistics Service in Washington, D.C., worked for several years in the Mississippi and California state agricultural statistics offices.

"It's very important that we have good cooperation from the farmers throughout the country," she says, "so that the information collected in the survey is accurate. It's the only information of this kind coming from a survey of this size and scope."

"Policymakers, USDA officials, and many other people rely on the information in making important decisions," she says.

"Obviously, when Congress sets policy, or when officials make decisions about U.S. agriculture, it is essential that the information relevant to those decisions be accurate."

Crawford notes that some farmers, especially those unfamiliar with the FCRS and the uses of its data, may not realize how important their cooperation in the survey is to their own well-being and to agriculture in general.

"Nearly everyone is very helpful," she says, "and is willing to contribute the necessary time and effort involved in participation in the survey. We need that help, and we certainly appreciate it."

Crawford points out that the survey information is used by many people, in many ways.

"The information, when used, isn't always attributed to USDA," she says, "but it's out there, in many forms and in many places, and is important to a lot of people."

She adds that one of the most crucial uses of FCRS data is by Congress, in the writing of legislation, such as the 1990 Farm Bill. "Congress needs to have accurate data about farm income and production costs and the many other aspects of the complex industry which is American agriculture," Crawford says.

Larger Farms, by Economic Class, Were More Likely to Be in a Financially Vulnerable Position in 1989

	Favorable	Marginal Income	Marginal Solvency	Vulnerable
		percent		
All farms	62.8	26.0	6.5	4.8
Economic class:				
Sales of $500,000 or more	60.8	14.8	18.8	5.6
$250,000 to $499,999	66.4	13.2	14.1	6.3
$100,000 to $249,999	67.8	12.2	15.5	4.6
$40,000 to $99,999	67.4	17.9	10.8	3.9
$20,000 to $39,999	67.9	22.2	5.1	4.8
$10,000 to $19,999	63.3	29.9	3.7	3.1
$9,999 or less	58.7	32.9	2.9	5.4
Region:				
Northeast	64.7	28.4	4.7	2.3
Lake States	65.5	18.9	9.6	6.1
Corn Belt	67.3	21.6	6.4	4.8
Northern Plains	58.0	22.9	11.9	7.2
Appalachia	72.3	20.5	4.0	3.2
Southeast	67.1	25.8	4.2	2.9
Delta	59.2	29.5	6.3	5.0
Southern Plains	55.7	35.6	5.0	3.8
Mountain	58.8	26.7	7.9	6.6
Pacific	49.4	37.9	5.5	7.2
Production specialty:				
Cash grain	64.2	21.2	8.8	5.9
Tobacco	77.6	12.3	6.9	3.2
Cotton	56.8	19.8	18.6	4.9
Other field crops	61.6	25.9	7.2	5.4
Vegetable, fruit, nut	61.0	31.8	3.9	3.3
Nursery, greenhouse	60.4	23.8	10.1	5.7
Beef, hog, sheep	62.4	29.2	3.5	4.9
Poultry	60.1	15.6	16.8	7.4
Dairy	72.3	11.9	13.3	2.6
Other livestock	45.8	44.7	5.7	3.9
Ratios:				
Debt/asset	0.07	0.08	0.59	0.65
Return on assets	0.05	-0.05	0.14	-0.09
Cash expenses/gross income	0.66	1.27	0.71	1.27

Source: 1989 Farm Costs and Returns Survey.

Farmers' cash earnings were higher in 1989, as higher commodity receipts offset lower direct Government payments and higher operating expenses. Average gross cash income increased by 7.5 percent. Cash receipts from the sale of crops and livestock (which represented more than 85 percent of gross cash income) grew by 9 percent and were largely responsible for higher gross cash income.

Direct Government payments represented 6 percent of gross income in 1989, compared with more than 10 percent in the mid-1980's. Average cash expenses rose by 2.4 percent.

Average net farm income increased by the largest percentage in the Southern Plains, Southeast, and Corn Belt regions in 1989. The Northern Plains was the only region where average net farm income declined.

A Decade of Volatility

The 1980's were characterized by great volatility in U.S. agriculture's financial position. FCRS data, and other types of information, show this.

The hard times in U.S. agriculture in the 1980's were tied to international conditions. About 30 percent of U.S. farm production goes overseas. Economic situations in other countries affect the level of U.S. export sales.

The agricultural boom of the 1970's was fueled largely by export expansion. But in the early 1980's, farm income decreased as exports declined and farm assets, especially land values, dropped sharply.

Many farmers, especially those who had entered farming or pursued a strategy of debt-financed expansion during the 1970's, found themselves in severe financial stress through much of the 1980's because of declining assets and income.

U.S. farmland values, one indicator of the volatility, peaked at an average of $823 per acre in 1982, fell to $599 over the next 5 years (a loss of one-third of the value of the nation's farmland), and then climbed back

Knowing the Terminology Helps in Understanding Data

Here are definitions of a few of the technical terms used in the analysis of Farm Costs and Returns Survey data:

Net cash farm income: the cash available to a farm operation after all cash expenses have been paid (including interest) for living expenses, principal repayment, income taxes, and other expenses or reinvestment in the farm business. It does not reflect the cash position of farm families because savings, wages paid to family members, and off-farm earnings are not included.

Net farm income: net cash income, less depreciation, plus the value of inventory change and nonmoney income. This measure reflects the return or loss to a farm operator plus unpaid family labor, management, and equity capital associated with a current year's production. Over time, net farm income shows the farm's ability to survive as a viable business.

Favorable: a farm in a favorable financial condition has positive net income and a low debt-asset ratio (0.40 or lower).

Vulnerable: a farm in a vulnerable financial condition has negative net income and a high debt-asset ratio (above 0.40).

Marginal solvency: a farm in a condition of marginal solvency has positive net income but a high debt-asset ratio (above 0.40).

Marginal income: a farm in a condition of marginal income has a low debt-asset ratio (0.40 or lower) but negative net income.

to $693 as of the beginning of 1990. Some of the major farming States saw even steeper declines. In Iowa, the total value of farmland (including buildings) was $67.4 billion in early 1981 but only $25.1 billion 6 years later. In at least five other States, the total value of farmland was more than halved during that 6-year period.

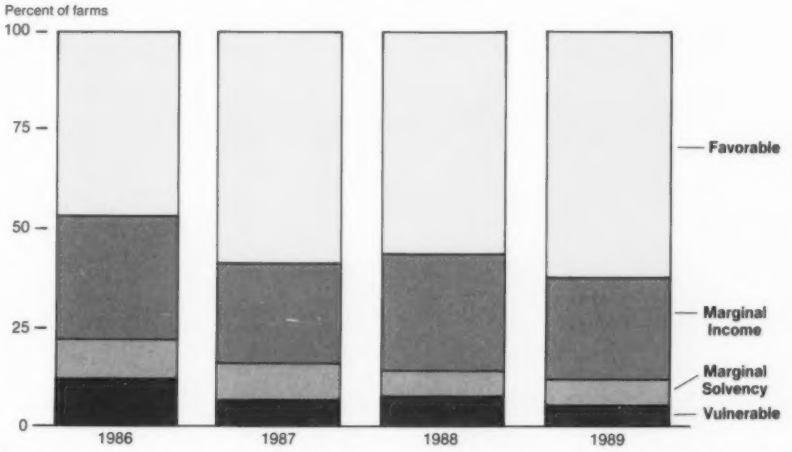
The United States exported 163 million tons of farm products in 1980 but only 110 million tons in 1986. For 1990 the figure was an estimated 148.5 million tons.

Total U.S. farm debt was estimated at $153.3 billion in 1987, more than $25 billion less than in 1980. But net farm income was $22 billion in 1980 and about $50 billion in 1989. Government payments helped bolster farm income during the lean years.

Real net cash farm income of $48.5 billion in 1987 was back up to about the level of the mid-1970's.

Recovery from the farm recession began by late 1986 and has continued since. But the 1987 value of farm assets, $691 billion, was just over half the peak 1980 value of $1.29 trillion (in 1982 constant dollars).

Financial Conditions of U.S. Farms Have Improved Since 1986



Farms in "favorable" condition have positive net farm income and debt/asset ratios of 0.40 or below. Those rated "marginal income" have negative net farm income and debt/asset ratios of 0.40 or below. Those rated "marginal solvency" have positive net farm income and debt/asset ratios above 0.40. Those rated "vulnerable" have negative net farm income and debt/asset ratios above 0.40.

Source: Farm Costs and Returns Survey.

24,000 Farmers Will Be Selected for Survey Sample

Work on the annual Farm Costs and Returns Survey (FCRS) goes on virtually year round.

Economists, statisticians, and others organize the data, analyze it, publish and distribute the information, study and refine their questionnaires and methods, and plan for the next survey.

The 24,000 farmers selected to be interviewed for the survey of the 1990 agricultural financial situation will be notified by mail in late January or early February. Meanwhile, USDA will be training the enumerators.

The survey is conducted each year by USDA's National Agricultural Statistics Service (NASS) and its State offices.

Those interviewed will constitute a random sample of U.S. farmers. The survey results will be applicable to about 1.8 million of the Nation's 2.1 million farms. Those not represented are mainly smaller farms with annual sales below $5,000.

The commodities to receive special emphasis in the upcoming survey are soybeans, grain sorghum, and cow-calf operations. (The questionnaires for producers of these commodities will include additional questions to help in the development of detailed cost-of-production data.)

The number of questions asked any individual producer depends on the size of a farm operation as well as the specific commodities produced.

"The reliable, detailed information that is gathered in the survey," says ERS economist Mitch Morehart, "is important to policymakers, farmers and their organizations, universities, the Extension Service, and other government agencies."

The FCRS provides a great deal of data about financial conditions in the nation's agricultural sector. ERS economists analyze the data each year and publish their findings in a number of reports.

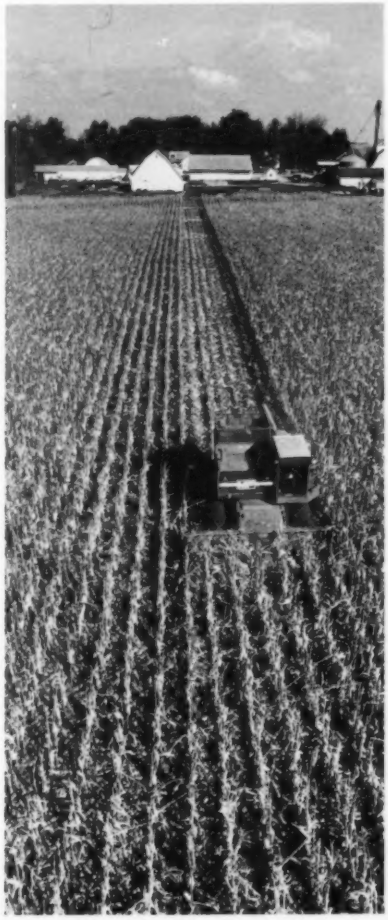
Many farmers and farm organizations, through "user advisory boards," are involved as advisers in designing and planning the survey. (USDA has a mandate from Congress to include them in the process in this way.)

In 1990, about 10,000 survey respondents received "individual farm analysis" reports on their own farm operations. Any of the survey participants who wanted such a report got one. This program is being continued in 1991.

All farmers and ranchers participating in the survey are guaranteed confidentiality. The survey data are fed into computers at NASS State offices, and the original questionnaires are destroyed. Then there is no record of any individual response to the survey.

The 1987 Census of Agriculture showed that during the 1980's several long-term trends continued, including declining farm numbers, decreasing land in farms, and increasing farm size. The 1987 farm count of 2.1 million was down 6.8 percent from 1982, and total land in farms of 964.5 million acres was down 2 percent from 1982. The average farm size increased from 440 acres in 1982 to 462 acres in 1987. □

[Based primarily on information from the Farm Costs and Returns Survey and economist Mitch Morehart of the Agriculture and Rural Economy Division, Economic Research Service.]



Net Farm Income Improved in Most Categories in 1989

	Net farm income							
	Negative		$0-$19,999		$20,000-$39,999		$40,000 or more	
	1988	1989	1988	1989	1988	1989	1988	1989
	percent							
All farms	36.3	30.8	45.8	47.0	7.9	9.2	10.0	13.1
Economic class:								
$500,000 or more	26.6	20.4	5.3	2.0	5.7	3.6	62.4	74.0
$250,000-$499,999	26.0	19.5	7.2	5.0	9.5	10.9	57.4	64.6
$100,000-$249,999	25.0	16.8	17.4	14.2	20.0	19.2	37.7	50.0
$40,000-$99,999	28.8	21.8	35.5	28.2	23.6	30.1	12.1	19.9
$20,000-$39,999	38.9	27.0	47.6	51.8	11.4	16.3	d	d
$10,000-$19,999	38.9	33.0	58.4	61.2	d	d	d	d
Less than $10,000	41.7	38.4	57.7	60.8	d	d	d	d
Region:								
Northeast	40.3	30.6	43.2	45.7	7.7	9.7	8.9	14.0
Lake States	37.9	24.9	40.0	43.8	10.1	14.4	12.1	16.9
Corn Belt	36.5	26.3	42.5	43.2	9.8	14.7	11.2	15.8
Northern Plains	27.5	30.1	37.2	39.3	16.5	13.7	18.9	16.9
Appalachia	32.7	23.7	58.0	64.2	4.2	5.2	5.1	7.0
Southeast	35.7	28.8	53.7	57.0	4.1	5.2	6.5	9.1
Delta	31.3	34.5	54.8	52.0	5.1	3.9	8.9	9.7
Southern Plains	43.9	39.3	43.0	46.0	7.0	6.1	6.0	8.7
Mountain	32.4	33.3	45.9	39.1	8.0	8.9	13.7	18.8
Pacific	42.9	45.1	38.4	35.5	5.3	4.1	13.5	15.3
Production Specialty:								
Cash grain	32.7	27.1	39.3	42.8	11.3	11.8	16.8	18.4
Tobacco	24.1	15.5	66.0	70.8	4.9	4.9	5.0	8.8
Cotton	25.1	24.6	33.6	14.3	14.8	20.0	26.4	41.1
Other field crops	28.5	31.2	59.4	53.7	5.8	4.8	6.3	10.3
Vegetable, fruit, nut	32.6	35.2	47.9	40.9	6.5	8.7	13.1	15.2
Nursery, greenhouse	40.9	29.5	33.8	41.5	7.6	11.2	17.7	17.8
Beef, hog, sheep	40.7	34.1	49.1	53.1	5.1	6.3	5.2	6.5
Poultry	28.1	23.1	30.8	30.3	13.8	14.1	27.3	32.6
Dairy	26.5	14.5	30.1	23.9	21.0	26.0	22.5	35.7
Other livestock	62.6	48.6	32.9	42.1	2.3	3.9	2.2	5.4

d = Data insufficient for disclosure.
Source: 1989 Farm Costs and Returns Survey.

Poland Struggles To Transform Economy

The Polish government is striving to transform the country from a centralized to a free market economy, and has taken independent steps more dramatic than those of any other Eastern European nation, according to economist Nancy Cochrane of USDA's Economic Research Service.

For example, in January 1990 Poland launched a radical program in which prices were freed, subsidies were eliminated, and the zloty (Poland's unit of currency) became internally convertible into foreign currencies. The program also provided for the breakup of the socialized meat and dairy monopolies that had dominated the economy for decades.

Polish producers, at all levels, believe that even more drastic measures must be taken, Cochrane says. Real income has fallen. And excessively high agricultural production costs and inefficient processing, marketing, retailing, and distribution still mitigate the success of the agricultural sector.

Nearly 70 percent of Poland's agricultural land is in small private farms averaging about 5 hectares (12.5 acres) each. Such farms account for nearly 80 percent of all agricultural output. The rest of the farm sector consists of some 4,500 state farms of about 1,000 hectares each. Both the private and state sectors have traditionally been subject to central planning and control involved with food processing, distribution, and agricultural inputs. The latter, especially, has made it difficult for small, private farms to obtain such necessities as machinery and fertilizer.

For example, under the Communist system, state farms received preferential access to agricultural inputs such as tractors, livestock slaughter facilities, milk collecting and processing plants, and grain milling and other handling and processing facilities. Under recently passed privatization legislation, the state farms will eventually be transferred to private ownership. The details, however, have yet to be worked out.

Food prices are now more in line with market conditions.

Poland's agriculture sector has been operating inefficiently. The distribution system that moves commodities from the farms to the grocery shelves, including handling and processing, has been plagued by high costs, inefficiency, and tremendous waste. In the past, prices and costs did not reflect relative scarcities as they do in the West, but were established under arbitrary and preferential criteria. For example, Cochrane points out that until recently high subsidies were paid to agriculture and food processing in order to maintain a system of high producer prices and low retail prices.

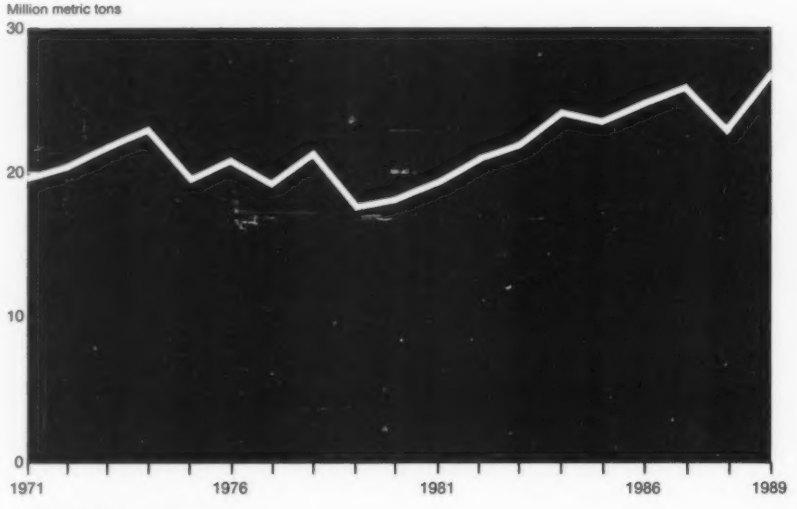
All the steps in the distribution system have been highly inefficient and have engendered excessively high costs, Cochrane says. As a result, both farmers and consumers lacked confidence in the system because it was wasteful and produced inadequate and low-quality food. Often farmers were forced to sell to the monopoly enterprises in the state procurement system, to their disadvantage.

Cochrane did note, however, that there has always been a domestic free market, where the prices were higher than on the state-controlled market. However, free market sales were thin because access to credit and agricultural inputs was tied to delivery contracts with state purchasing organizations. In addition, since middlemen were banned until 1989, farmers were only able to market the produce they could transport themselves. Often this transport was a horse cart.

Help Sought From the West

Food is the pivotal issue as the Polish people decide how well the government is doing, according to the Borlaug II Mission that visited Poland in September 1989. The

Poland's Total Grain Production Has Been Increasing



Source: Poland's statistical yearbook.

mission was sponsored by the Rockefeller Foundation. Norman Borlaug, Nobel Prize-winning plant breeder, headed two missions to Poland to advise the Poles on how to improve their grain yields.

The food situation in Poland is improving, according to Cochrane. No longer do consumers have to wait in long lines. The quality and selection of food are improving. Subsidies have been removed, so food prices are more in line with domestic market conditions.

The Poles are not going hungry, and their domestic farm production in 1990 was similar to that in 1989. Polish farmers will increase output if they have greater access to agricultural inputs and better economic incentives, Cochrane says.

Western nations can help by assisting in the overhaul of the purchasing, transportation, processing, storage, wholesaling, and retailing operations of the agricultural industry. They can also help start new plants, set up training programs for managers, and aid in collecting and processing statistics.

Despite the constraints and economic difficulties of the 1980's, agricultural growth in Poland has been impressive. In fact, "Poland has tremendous potential to become an exporter on a significant scale because it has natural conditions for success," Cochrane says. The country's advantages include having the largest amount of arable land in Eastern Europe.

Before World War II, Poland was a major exporter of pork, grain, and fruit. After decades of stagnation since the war, Poland is now coming close to being a net agricultural exporter. Traditionally, it has excelled in swine production. Improvement of products is provided by Polish scientists (many with degrees from western universities), the best-trained in Eastern Europe, according to the Borlaug Mission report.

Poland's farm problems center on the predominance of small, inefficient farms and the difficulty in obtaining, distributing, and properly using agricultural inputs. Most trade with the West is stimulated by the need for hard currency, needed to purchase inputs and advanced technology.

Recent Political and Economic Changes in Poland

1980 Poland defaults on debt repayment to United States.

1981 December. General Wojciech Jaruzelski, prime minister, declares martial law, suspends Solidarity Trade Union, arrests thousands of union supporters.

1982 October. Rural Solidarity, an offshoot of the Union, banned.

1983 July. End of martial law; general amnesty.

1986 October. Second amnesty for political prisoners.

1989 January. Monopoly of state purchasing agencies abolished, making it legal to purchase from farmers at free-market prices.

1989 April. State control of producer prices abolished (state now sets only guaranteed minimum prices, with no limit on how high farm prices can go).

1989 Spring. Government-sponsored roundtable discussions resulted in the representation of Solidarity Trade Union in Parliament.

1989 August. New government formed, consisting of upper and lower legislative houses, dominated by Solidarity; Jaruzelski named president; Tadeusz Mazowiecki named prime minister.

Decree removes legal restrictions on setting retail prices.

Meat rationing ended.

1990 January. Removal of virtually all government subsidies and freeing up of most prices.

Strict controls imposed on other government spending.

Tough wage controls imposed on Polish workers.

Convertible currency introduced to attract foreign capital, repatriate profits, and facilitate free trade on world markets.

1990 August. Passage of Privatization of State Enterprise Act and the Office of Minister for Ownership Transformations Act.

Crop Yields Have Improved

Despite the lack of good machinery, adequate fertilizer, pesticides, and other inputs, yields of all crops increased in the 1980's. Good weather was one reason. In 1989, the harvest reached a record 27 million tons of grain and 1.5 million tons of rapeseed. Another plus has been improved crops, such as triticale, a new, high-yielding cereal grain that is a cross between wheat and rye. Triticale has replaced small amounts of potatoes and rye in area because of its nutritional superiority.

The new crop is good for cattle and hog feed, and excellent for chickens. It also has possibilities for being milled and baked into bread for human consumption. Polish researchers developed a superior variety, and now the country leads the world in triticale production. Poland has the capacity to increase its yield 40 to 60 percent over the next decade.

Poland is the world's third largest producer of potatoes—after China and the Soviet Union. Potatoes are a staple in the rural diet, and an important component of livestock feed.

Poland's 1.4 million hectares of arable land are light and sandy and tend to be acidic. The climate is temperate, with highly variable winters and a short growing season. More than one-fourth of the land is forested, and just over one-half is used to produce such grains as rye, wheat, barley, and oats. One-fifth of the land in crops produces potatoes, and smaller areas are used for rapeseed and sugar beets. Conditions also favor the cultivation of apples, pears, plums, and cherries.

Polish soils are often infertile, and require careful management. They are better suited to grain and forage production than to more intensive cropping, which requires large amounts of agricultural inputs. For this reason, Poland's long-term comparative advantage probably lies in livestock production. But productivity in that sector has lagged because of poor nutrition. Until recently, pigs and chickens have been fed a variety of grasses, forages, fodder beets, potatoes, and other materials that are deficient in protein.

Livestock Output Increasing

Livestock production declined in the 1980's due to the reduction in feed imports, but the trend has started to reverse. Like crop production, raising livestock is highly traditional and labor intensive. Efficiency varies widely from farmer to farmer, depending on access to feed supplements and other inputs.

Milk output peaked at 17 million tons in 1978, declined to 16 million tons in 1983, and rose to 16.7 million tons in 1984. Since then it has steadily fallen. Cattle inventories have been declining in recent years, due to poor profitability. Much of the milk is used inefficiently because refrigeration and sanitation are inadequate, according to Cochrane.

Swine production remains important. Swine output fell sharply after 1981, when imported feeds were limited after Poland defaulted on its debt repayment, but rebounded above the 1980 level in 1986-88. During the 1980's the number of pigs per sow increased.

Productivity in the hog sector is still low by modern standards, however, limited mostly by poor nutrition. While it is difficult to evaluate the genetic potential of the pigs under Poland's present conditions, it is probably quite high. A national breeding program begun in the 1930's has made highly productive breeds and crosses available, and development of still more productive pigs is continuing.

Like cattle and pigs, the potential for poultry has been diminished by poor nutrition. Production is still below 1980 levels, supplying 17.6 pounds of poultry meat and 200 eggs per person per year (compared to 85.5 pounds of poultry meat and 235 eggs per capita in the United States).

Traditional poultry operations with small private flocks are still prevalent. Producers with 20 to 60 birds account for more than 80 percent of egg production and nearly one-fourth of poultry meat. Recently, commercial ventures have expanded and traditional production methods are declining.

As in the development of crops and other livestock, the government has improved poultry breeding stock. It maintains a national breeding flock for both broilers and layers, which supplies foundation stock to more than 2,000 breeding farms throughout the country. Also, a Poultry Research and Development Center, in operation since 1976, has developed several successful

Poland Has a Tradition Of Productive Agriculture

The post-World War II period was marked by conflicts over the Polish government's efforts to socialize farms, despite their long tradition of individual ownership.

Socialized farming included these categories of operations: state farms, which use wage labor; collectives; and agricultural associations, or "circles," which were formed originally as cooperatives but became subject to state control.

In 1948 the government called for full collectivization, a policy enforced by the imposition of progressive taxes on private holdings and the requirement of food deliveries to the state. By 1955, Poland had more than 10,000 collectives. Peasant opposition was strong, leading to an upheaval in 1956 and the rise to power of Wladyslaw Gomulka. More liberal policies followed, such as permitting participation in collectives to be voluntary. Farmers withdrew en masse, and the number of collectives fell to under 2,000.

Acquisition of state land for government use continued, but at a reduced rate, through the State Land Fund. This was originally set up in 1946 to obtain land acquired from churches, German holdings, and collaborators, and later also from elderly farmers unable to pass on their land to heirs or forced to relinquish it in exchange for a state pension. Between 1960 and 1981 the number of private farms declined from 3.6 million to 2.9 million.

Widespread dissatisfaction, however, led to the repeal of earlier measures and by the mid-1980's farmers could bequeath their land to heirs and receive a pension not tied to giving their land to the state. Other reforms were introduced, such as requiring the success of farms to be measured in profitability and reducing central control and direction.

The collapse of the collective movement was followed by the government's encouragement of agricultural associations, or circles. By 1981, there were 1,882. Although these were designed to help the peasants obtain farm machinery, they were set up as an initial step toward collectivization, and eventually became state-run enterprises more responsive to central directives than to the needs of farmers.

Farmers became even more alienated in 1972 when the government formed cooperatives from groups of the private cooperatives, or circles. Unlike their position in a circle, ordinary farmers had little to say about management of a government cooperative. Official records show 35,000 circles in the late 1970's, having some 2.6 million members in 90 percent of the country's villages.

As the state farm and agricultural collectives expanded over the post-World War II decades, agricultural productivity declined. Poland lost its ability to meet its food needs and developed a constant deficit requiring regular importation of food. Finally, in 1980 and 1981 widespread dissatisfaction with all socialized arrangements and a desire for more representation led to the creation of Rural Solidarity. This is an offshoot of the urban Solidarity Trade Union. While all members of both groups recognized the inherent conflict between the farmer and the urban dweller over the cost of farm products, they were united in the common dislike for the intermediary organizations between farm and consumer.

Productivity continued to stagnate over the past decade, and farmers have remained skeptical. The new government has yet to prove itself.

strains of broilers and layers that are widely used in Poland and have helped improve the genetic potential of Polish flocks.

Again, as with other livestock, the high genetic potential is limited by the shortage of proper feeds. The lack of technical assistance in training managers in modern techniques is another difficulty.

Although most crop production is used to support livestock, output is insufficient to meet the feed requirements of the livestock sector. In fact, although they are stable now, livestock numbers were in a downward trend through most of the 1980's.

The Future for Poland

Cochrane believes that Poland will eventually become a net agricultural exporter, and that one of its principal products will be pork, which is exported in the form of ham and sausage. Poland thus does not compete with the United States, which exports primarily fresh or frozen meat.

Poland could become a market for cotton, processed foods, agricultural chemicals, animal genetics, and artificial insemination technology. Since its soils are not conducive to growing and exporting grain, it may continue to import grains from the United States. □

[Based primarily on information provided by economist Nancy Cochrane of the Agriculture and Trade Analysis Division, Economic Research Service.]

New Crops, and Old, Offer Alternative Opportunities

This article—the first in a two-part series—describes potential industrial uses for new and established crops. The second article, scheduled for the February issue of Farmline, will discuss the alternative production and marketing opportunities offered by environmental horticulture and such specialty commodities as fruits and vegetables, essential oils, and herbs.

American agriculture in recent years has been showing more interest in exploring alternatives to traditional enterprises.

Farmers are trying new crops. Some of these crops have industrial applications, some are filling niches in the food marketing system, and some can be used in landscaping and decorating. Processors are using both new and established commodities to make familiar products.

Economists Katharine Buckley of USDA's Economic Research Service and Michael Dicks, formerly of ERS, recently took a look at some of the alternative agricultural opportunities available to U.S. farmers.

"Developing new crops and products could raise farm income while reducing Government subsidies and crop surpluses, the trade deficit, and the potential adverse environmental effects of farm production," the economists explain. Alternative opportunities (defined as any new enterprise, product, or production or processing technique) can help U.S. farmers and rural economies by increasing the competitive advantage of their current enterprises or offering them profitable ways to diversify their output.

Import substitution (using a domestic crop or product in place of an import) offers one measure of the market potential for alternative enterprises. "Substituting new crops or products for currently imported items could add as much as $15-$20 billion per year to U.S. farmers' income," Buckley and Dicks estimate.

A new crop or product's ability to successfully compete with or displace established crops or products will determine its economic longevity. For a new crop or product intended as an industrial input to carve out a market niche, it must offer either better quality at competitive prices, or equal quality at lower prices. It must be of consistent quality and quantity, and processors must be able to convert it into several final products.

New Crops With a Variety of Uses

The economists, working with Donald Van Dyne, agricultural economist at the University of Missouri-Columbia, studied plants such as meadowfoam, jojoba, and lesquerella, which can yield oils with a variety of industrial applications. Kenaf can be used to make newsprint and cordage. Canola produces an edible vegetable oil that has many potential commercial uses. Guayule produces natural rubber. And soybeans, already widely used in food and feed, can be used in printer's ink.

Industrial rapeseed is an oilseed plant that produces seeds made up of 40 percent oil (half of it high erucic acid oil, the rest fatty acids) and 60 percent high protein meal. The aquaculture industry's search for a palatable, high protein substitute for fishmeal may provide one market for rapeseed meal.

Most of the erucic acid oil from rapeseed is processed and used as a slip agent to ensure smoothness in the manufacture of plastic films. Other potential uses, several of which could substantially boost market demand for the oil, include plasticizers (used to keep plastics soft), nylons, cosmetics, lubricants, functional fluids (such as brake and transmission fluids), paints and coatings, polyesters, surfactants, flotation agents, pharmaceuticals, and fluids that do not conduct electricity.

About 40 million pounds of erucic acid, valued at roughly $56 million, are used in the United States each year, and more than 80 percent of this amount is imported. An additional 40,000 acres of industrial rapeseed would be needed to meet total domestic demand and eliminate imports. Van Dyne points out that the trend toward using erucic acid to replace other fatty acids in the production of synthetic fibers is heightening demand, and could encourage further acreage expansions.

In 1988, the United States harvested an estimated 13,000 acres of industrial rapeseed, split almost evenly between the Pacific Northwest and the Midwest. Rapeseed can be planted in early fall in moderate climates, or in early spring in harsher climates. (The yields of crops seeded in the fall are almost twice as high as those seeded in the spring.)

The economists state that several problems are blocking the development of industrial rapeseed into a major crop. These include the need to boost yields (and thus trim unit production costs), heighten interest in processing the crop, expand demand for products made from high erucic acid, and reduce or remove glucosinolates (substances that are toxic in large quantities) from the meal so it can be consumed as feed by most types of livestock and poultry.

Kenaf (kay' naf) is an annual, nonwood fiber plant that can be substituted primarily for newsprint imports, and for jute imports to make cordage (used in carpet backing and padding, roofing, felt, and coated papers). Kenaf can also be used for chicken litter, fire logs, cardboard, and sewage treatment. "Second only to industrial rapeseed in its commercial potential, kenaf can be grown in moderate climates from Florida to California," Van Dyne says.

Newsprint made out of kenaf is as strong as that made from wood pulp, and offers the added advantages of greater brightness, slower discoloration, and less ink ruboff. The United States uses about 12 million metric tons of newsprint each year, of which almost 4 million metric tons are imported at a cost of about $4.5 billion. Another $6 billion goes to import wood pulp, paper and cardboard products, and cordage items that could be replaced with kenaf.

USDA's Cooperative State Research Service (CSRS) is working to promote the

acceptance of kenaf in pulp, paper, and fiber product manufacturing. Research and development (both private and public) has also led to the construction of a kenaf-based newsprint mill in southern Texas. USDA contributed to this project by helping to develop the plant's design and processing technology, and by encouraging farmers to diversify into kenaf production. USDA and Kenaf International, an industry investor, have announced that the mill will cost about $35 million and will open in 1991.

Worldwide production of **canola** (an edible rapeseed with low to zero levels of erucic acid in its oil and low to zero levels of glucosinolates in its meal) has boomed in recent years, partly because it can be grown in many regions that are unsuitable for soybeans. But the key element driving this expansion is the fact that canola oil contains the lowest level of saturated fat and the highest level of unsaturated fat of any edible vegetable oil. Some research indicates that these nutritional attributes can reduce the risk of coronary heart disease and certain types of cancer.

Canola imports began to rise sharply in 1985, when the U.S. Food and Drug Administration (FDA) accorded it the status of "generally recognized as safe" (GRAS). The import value of canola oil reached $64 million in 1988, up almost threefold from the previous year.

Slightly more than 152,000 metric tons of edible rapeseed oil were imported in 1988. With a yield of 2,000 pounds per acre and an oil content of 40 percent of seed weight, about 426,000 acres of domestic canola production would be needed to replace 1988 import demand. "Although official statistics of domestic canola acreage and production are not kept, one industry source estimates that 50,000 acres were planted in the fall of 1988, and 175,000-200,000 acres were planted in all of 1989," the economists report.

— *Photos by Priscilla Glynn*

Canola meal is a high-quality feedstuff with a protein content of 37-38 percent, making it worth 70-80 percent of $1.00 worth of soybean meal (with a protein content of 44 percent). "If canola meal prices were to fall significantly below soybean meal prices, canola could become an attractive feed ingredient," Van Dyne states.

Although canola can be grown in many areas of the United States, it is mainly produced in the Pacific Northwest, the Plains States, and the Southeast. A plant for processing both edible and industrial rapeseed is being built in Velva, North Dakota, and will likely spur production in that area. U.S. Canola Processors, a joint venture of Central Soya and Calgene, Inc., has begun processing canola and industrial rapeseed at a plant in Chattanooga, Tennessee. The resulting canola oil will likely be refined at the plant and distributed to food manufacturers in the East, and the meal will be marketed to feedmills and livestock feeders throughout the South.

Crambe (kram-bay') is a cool-season annual that is planted in early spring and harvested in midsummer. Crambeseed consists of about 35 percent oil and 65 percent high protein meal (the current use of which is limited primarily to beef cattle feed).

The oil contains 55-60 percent high erucic acid and 40-45 percent other fatty acids. Lab tests now under way may show that crambe oil and industrial rapeseed oil are interchangeable. The economists explain that if this is the case, crambe (planted in spring) and rapeseed (usually planted in fall) could provide the livestock industry with year-round supplies of non-erucic acid oil as a feed ingredient.

Although crambe is not produced on a commercial scale, it has been grown on a small scale in several States in the past, most notably in Indiana. Given its climatic requirements, crambe production would likely enjoy the greatest competitive advantage in the Midwest.

"The primary problems hampering the development of a high erucic acid industry based on crambe are similar to those of industrial rapeseed," Van Dyne explains, "namely, the need to lower unit production costs and remove glucosinolates from the meal to broaden its potential use as a feed supplement for livestock, poultry, and fish." Moreover, since erucic acid from industrial rapeseed is already in commercial use, crambe oil would have to be functionally interchangeable with rapeseed oil for its production to offer real economic promise.

Meadowfoam is a winter annual oilseed plant that produces oil and meal. The oil can be used in personal care products, such as soap, hair care items, and moisturizers. The stability of its oil also makes meadowfoam an excellent material for use in lubricants, polymers, and waxes.

Meadowfoam oil can replace jojoba oil in some cosmetic and industrial applications, and record-high jojoba oil prices in 1981 heightened interest in meadowfoam production. Interest in cultivating the potentially large export markets of Canada and Japan is also increasing. Meadowfoam grows in a wide variety of environments, but is best

Prospects for Agriculturally Based Industrial Products

Crop	Products	Major Uses	Commercialization Difficulties	Import Substitution
Industrial rapeseed	high erucic acid oil	plastic film, plasticizers, nylons, polyesters, cosmetics, lubricants, paints & coatings, surfactants, flotation agents, pharmaceuticals, nonconducting fluids	Need to increase yields, heighten processor interest, expand demand for high erucic acid, reduce/remove glucosinolates from meal	Could replace $46.4 million in imports (1988)
	rapeseed oil	livestock feed		
	high protein meal	livestock or aquaculture feed		
Canola	edible vegetable oil	cooking oil, food processing	Need to reduce prices, heighten processor demand	Could replace $64 million in imports (1988)
	high protein meal	livestock feed		
Kenaf	nonwood fiber	newsprint, cordage, chicken litter, fire logs, cardboard, sewage treatment	Need to promote acceptance, heighten processor interest	Could replace $10.5 billion in imports
Crambe	high erucic acid oil	See industrial rapeseed	Similar to industrial rapeseed; also, must be able to use it interchangeably with rapeseed oil to obtain maximum returns	NA
	crambe oil	livestock feed		
	high protein meal	beef cattle feed		
Meadowfoam	oil	soap, hair care items, moisturizers, lubricants, polymers, waxes	Need to raise yields, develop production area, stimulate processor interest	NA
	meal	livestock feed		
Jojoba	oil	cosmetics, lubricants, transmission fluids	Need to overcome high production costs, lack of research and experience, find market for jojoba meal	NA
	meal			
Lesquerella	oil	lubricants, plastics, protective coatings, pharmaceuticals, dietary supplement for beef cattle	Need to identify strains with greatest oil concentrations	Could reduce $28 million in imports (1988)
	meal			
Guayule	rubber	tires, fan belts, surgical items, hydraulic hoses, carbon char, resins	Need to develop direct seeding, increase rubber yields, establish markets for nonrubber products	Could reduce $1 billion in imports (1988)
	plant tissue	cork, fiber		
Soybeans	oil	printer's ink, dust suppressant	Need to boost production	Could replace 980 million lbs. in imports (1987)

NA = Not available.
Source: Katharine C. Buckley, Commodity Economics Division, ERS.

adapted to the poorly drained soils of the Pacific Northwest.

"The problems in commercializing meadowfoam include the need to increase seed oil yield to cut unit production costs, and to raise sufficient quantities in any given area to support a local processing plant," the economists explain. "Excess capacity in jojoba processing plants in California could perhaps be used to process meadowfoam while the industry finds a foothold in the economy."

The **jojoba** shrub, a slow-growing perennial that has been produced commercially for 10 or 15 years, is native to the Sonora Desert of Arizona and California. Its oil provides a natural base for cream ointments and many other products in the cosmetics industry. In addition, the oil has characteristics that make it a desirable ingredient in lubricants and their additives. Van Dyne notes that products containing jojoba oil have performed as well as or better than those with petrochemical additives.

"Although jojoba remains a minor crop, its growth from 1976 through 1988 was substantial," the economists report. In 1976, about 12 metric tons of seed were harvested, yielding some 5 metric tons of jojoba oil. By 1988, jojobaseed and jojoba oil production were estimated at 1,340 and 570 metric tons, respectively.

About 90 percent of domestic jojoba oil production is used in the cosmetics industry. Since demand for jojoba oil in cosmetics is relatively fixed, the industrial products market offers the greatest potential outlet for the product. Its use as an oil or oil additive in automatic transmission fluids and engine oil is believed to reduce engine wear and lower engine operating temperatures by reducing friction. At least four companies now use jojoba oil in lubricant formulations.

But various factors are inhibiting jojoba expansion. These include the need to cut unit production costs, a lack of research and experience in its commercial production, the need to protect it from frost and to control weeds, the considerable timelag between planting and realization of full harvest potential, and the lack of an economically viable market for jojoba meal.

Lesquerella is a small, bushy, oil-bearing plant that grows wild in Arizona, New Mexico, Oklahoma, and Texas. A member of the mustard family, it grows in poor quality soils and requires little rainfall. The oil in the seeds (which can make up as much as 25 percent of the seed weight) contains fatty acids used in lubricants, plastics, protective coatings, and pharmaceuticals.

Van Dyne points out that because the fatty acids resemble castor oil in their chemical structure, they could reduce castor oil imports (valued at nearly $28 million in 1988). Moreover, the meal from lesquerella seeds is an excellent source of a protein especially high in lysine, an amino acid that promotes growth, and can be used to supplement beef cattle rations.

Because lesquerella grows in the wild, many varieties with widely differing oil concentrations exist—indeed, one of the chief problems impeding commercialization of the plant is the need to identify the strains having the greatest economic potential. "Yet cultivation of such strains could offer a viable alternative to traditional crops, since researchers have found that the most profitable strains yield oil containing 57-60 percent fatty acids," the economists note.

Guayule (gwa yoo' le) is a bushy, drought-tolerant, perennial shrub native to the desert areas of north-central Mexico and southwest Texas. Because it produces a natural rubber functionally interchangeable with that of the hevea tree, widespread commercial production of guayule could significantly reduce U.S. imports of rubber and rubber products, which cost $1 billion in 1988. Southern New Mexico and Arizona and western California also provide suitable climates for guayule production.

Guayule rubber can be used to make tires, fan belts, surgical items, hydraulic hoses, carbon char, resins, and numerous other industrial and household products.

Rubber is produced in the stem and root tissues of the plant. Economically promising markets for products that can be made from the rest of the plant (about 90 percent of its weight) are needed to sustain commercial guayule production, and research-

ers are exploring the possibilities. Nonrubber products currently associated with guayule include waxes, cork, and fiber.

Another barrier to the commercialization of guayule is the need to cut production costs by developing a direct seeding technology (thus eliminating the need to transplant seedlings) and increase rubber yields through breeding and modified harvesting techniques. The economists explain that these problems must be solved before guayule can truly compete with the less expensive hevea rubber imports.

New Applications for an Old Crop

In addition to their widespread use in food and feed, **soybeans** are an excellent source of several industrial products, of which printer's ink has attracted the most attention.

Soy-oil ink is used for printing in color as well as in black and white, and its advantages over traditional inks include less ruboff, sharper, brighter colors, and easier press cleanup. It also allows more copies to be printed per volume of ink—colored pigments blend more easily with soy-oil than with petroleum-based oil, so the ink can be applied in a thinner layer. "The American Newspaper Publishers Association (ANPA) has indicated that at least one-third (more than 1,000) of all U.S. newspapers are using soy-oil ink," the economists state, "and most will probably switch to using it within 2 years because of its superior color quality."

The price of soy-oil ink currently exceeds that of petroleum ink by about 50-60 percent—largely because more steps are required to manufacture it. Nevertheless, more than 35 commercial ink companies are now making soy-oil ink under licenses granted by the ANPA, and research to eliminate some of the production steps is under way.

If all domestic newspapers used only soy-based ink for black and white and color, they would stimulate an annual demand for the oil of about 350 million pounds. Assuming yields of 11 pounds of oil per bushel, some 31.8 million bushels of soybeans per year would be needed to support the newspaper industry.

Soy-based ink could replace U.S. ink imports (which totaled roughly 980 million pounds in 1987). "The impetus soy-based ink could give to soybean production, when all commercial applications are considered, is almost 63.4 million bushels," Van Dyne estimates.

Soy-oil can also be used to suppress dust in grain elevators. When applied to the grain in small amounts (0.02 percent by weight), it has reduced the dust by up to 99 percent. Indeed, tests on corn, wheat, and soybeans treated with soy-oil have shown that it has no effect on odor, grade, drying characteristics, mold growth, or milling and baking qualities.

The tests also indicated that treating grain with soy-oil may improve insect control. FDA has approved the treatment for use, and USDA's Federal Grain Inspection Service is considering the matter.

Outlook for Alternatives Uncertain

The economists note that the industrial application of existing and new agricultural products may offer U.S. producers a real chance to expand their markets. But they caution that promising crops and products must be studied carefully to determine their economic viability and biological sustainability. And although existing equipment can be used to produce and process some crops, specialized equipment is required for others.

The Government has encouraged agricultural innovation by providing funds for research and other resources. In 1984, CSRS launched a program to help the private sector develop and commercialize highly promising new crops and products. Private firms and public institutions are currently receiving public support to develop crops such as kenaf, crambe, and guayule.

"But the availability of public assistance for developing alternative crops and products varies," the economists state. "Moreover, Federal budget constraints have reduced the amount of money for research in the area."

Establishing industrial applications for existing and new agricultural products depends on commercialization as well as successful research and development. The economists explain that using public funds to speed up technological advances to sharpen a selected product's competitive edge may be the most fruitful role the public sector can play.□

[Based on information provided by economists Katharine C. Buckley, Commodity Economics Division, Economic Research Service, Michael R. Dicks, formerly of ERS and now a professor of agricultural economics at Oklahoma State University, and Donald L. Van Dyne, a research associate professor of agricultural economics at the University of Missouri-Columbia.]

Foreign Ownership of U.S. Farmland Holding Steady

Foreigners owned 12.9 million acres—slightly less than 1 percent—of all privately held agricultural land (farm and forest) in the United States, as of December 31, 1989. This amounts to 0.6 percent of all land in the country.

These data are based on reports submitted to USDA in accordance with the Agricultural Foreign Investment Disclosure Act of 1978.

"A number of land parcels are owned only in part by foreign investors—that is, the foreign interest in some parcels is less than 100 percent," explains attorney Peter DeBraal of USDA's Economic Research Service. "When the 12.9-million-acre figure is adjusted to reflect these partial interests, the total foreign-owned acreage drops to roughly 11.9 million acres."

Foreign ownership of U.S. agricultural land hovered slightly above or below 1 percent of all privately held agricultural land from 1981 through 1987.

Corporations own 81 percent of the foreign-owned acreage, partnerships, 10 percent, and individuals, 7 percent. The remainder, about 2 percent, is held by estates, trusts, and other entities.

"U.S. corporations in which foreign persons have a significant interest or substantial control reportedly held 60 percent of all foreign-owned acreage," notes DeBraal. The act assigns foreign person status to certain U.S. entities holding direct and indirect interests in U.S. agricultural land by defining each successive link in a chain of U.S. entities containing foreign interests as a foreign person.

The reporting entity need not therefore actually be foreign, but under the act is considered to be a foreign person because another foreign person has a significant interest in or control over it. The regulations define "significant interest or substantial control" to mean a 10-percent or more interest in the entity if held by a single foreign person or group of foreign persons working together, or a 50-percent or more interest if it is held by a group of foreign persons not working together, none of whom individually owns a 10-percent or greater interest in the entity.

Persons from Canada own the most foreign-held U.S. agricultural acreage of any country—23 percent, or 3,043,227 acres. Persons from the United Kingdom, West Germany, and France own 2,721,715 acres (21 percent), 1,156,388 acres (9 percent), and 915,610 acres (7 percent), respectively.

Persons from the Netherlands Antilles, Switzerland, and the Netherlands own another 12 percent of the foreign-held acreage. Persons from Japan own only 2 percent.

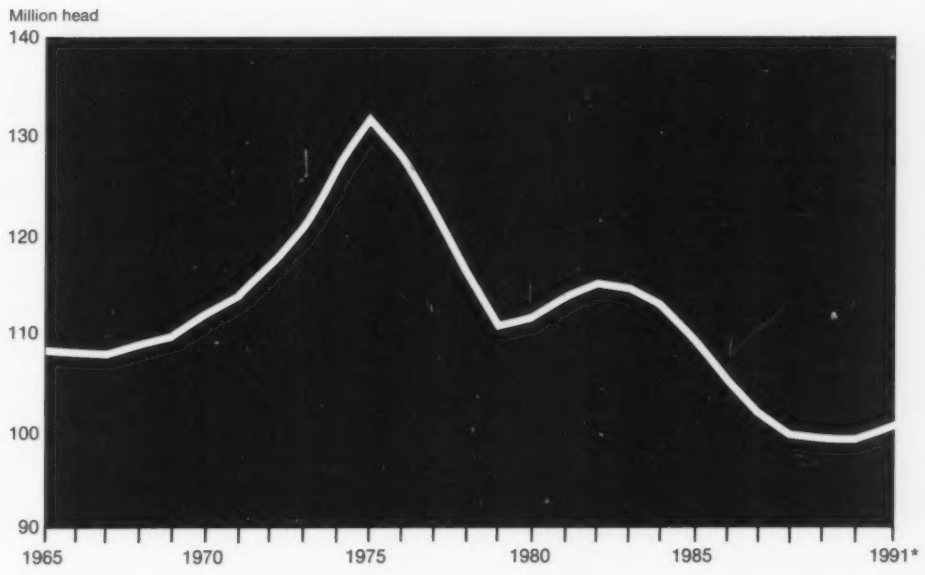
DeBraal notes that the average per-acre purchase price and nonpurchase price (estimated value) was lowest for corporations ($672), followed by individuals ($965), all others ($1,274), and partnerships ($1,570).

Forest land makes up 46 percent of all foreign-owned acreage, cropland, 18 percent; pasture and other agricultural land, 31 percent; and nonagricultural land, 5 percent. "Foreigners do not appear to be taking U.S. farmland out of production to any appreciable degree," DeBraal reports, "and no change in intended use was reported for 93 percent of the acreage."

Foreign investment is concentrated in the South and West, with each of these regions having 35 percent of the reported foreign holdings of U.S. agricultural land. Maine has the largest proportion of foreign-owned U.S. agricultural land—2.07 million acres, or about 16 percent of the foreign-owned agricultural land in the United States. Rhode Island is the only State that reportedly has no foreign-owned land.

—Priscilla Glynn

The Inventory of U.S. Cattle Is Increasing After Several Years of Decline



*Projected.
(All cattle and calves on farms January 1.)

Fed Cattle Marketings Expected to Increase

The January 1, 1990, U.S. cattle survey showed an inventory of 99.3 million head, up about 150,000 head from the previous year. The next inventory will be announced in February.

In 1991, strong demand for reduced feeder cattle supplies is expected to support fed cattle marketings near to slightly above the 1990 levels, according to Ron Gustafson, cattle analyst with USDA's Economic Research Service. However, to hold up or expand fed cattle marketings, larger numbers of nonfed steers and heifers and veal calves must be available for placing on feed, he says. Large numbers of calves formerly slaughtered for veal are already being bid into the feeder cattle supply. Veal calf slaughter in 1990 will be less than half the mid-l980's level.

Higher grain stocks and lower grain prices give additional incentive to beef producers to place more cattle on feed. As grain prices decline, the cost of finishing cattle is reduced, allowing cattle feeders to bid more aggressively for feeder cattle, Gustafson noted.

Cow slaughter has already declined to near 6 million head annually from over 8 million in the mid-l980's. In addition, nonfed steer and heifer slaughter has declined sharply, falling from a range of 2-2.5 million head in the mid-1980's to below 700,000 head in 1990. Both veal and nonfed steer and heifer slaughter have been reduced to low levels, and further sizeable declines will be unlikely. This shift has resulted in the fed cattle slaughter proportion rising from 70 percent in the mid-1980's to near 80 percent in 1990. Fed cattle marketings are expected to be 1 to 2 percent higher in 1991. However, further increases in fed cattle marketings and beef production will depend on an expanding calf crop and thus feeder cattle supplies.

Cow-calf producers are looking forward to a continuation of positive returns above cash costs at least through 1991. Cattle inventories and consequently beef supplies are near cyclical lows in 1990 and 1991. However, moderate increases in beef cow numbers in 1990 and in the number of heifers retained (4 percent more than in 1989) are expected to increase the calf crop in 1991 and expand beef production by 1992.

These moderate increases will have only a minimal effect in depressing cattle prices in 1992, according to Gustafson. The production increases will only begin to exceed population growth so the amount of meat available per person will increase, thus holding down prices.

In 1990, prices for Choice fed cattle in Omaha were up 5 percent to a record level. Feeder cattle prices were also at record levels in 1990. With expectations for only moderate production gains, continued low feeder cattle supplies, and reduced grain prices, cattle prices are expected to set new records in 1991. (The lower the grain prices, the more feedlot operators are able to pay for feeder cattle and still make a profit.) Should heifer retention accelerate from the moderate rate of 1990, further reducing feeder cattle supplies, feeder cattle prices could rise greater than expected in 1991.

A larger proportion of the heifers retained for the breeding herd during the summer of 1990 will calve in 1991, expanding feeder cattle supplies in the fall, and resulting in larger beef supplies in 1992. Thus, 1991 will likely be the last year of record prices for this cattle cycle, Gustafson noted.

Cattle numbers are expected to expand at a moderate rate during this cycle (which began 2 years ago), thus holding down production and price swings. As beef production begins to expand in 1992, beef prices will come under more pressure. Continued large poultry supplies and an expected cyclical upturn in pork production in 1991 are expected to further depress prices for these already lower priced meats, and to slow the price increase for the relatively more expensive beef.

Cattle inventories and thus beef supplies are expected to expand at a moderate rate into at least the mid-1990's. Lower grain prices and increasing feeder cattle supplies beginning in 1992 are expected to keep feedlots full and expanding through this period.

The 1979-89 cattle cycle was distorted by the financial difficulties of the farm sector as well as by the drought and poor returns on cattle. As a result, many farmers, particularly on mixed crop-livestock farms, sold their cattle to generate cash. These producers have likely not generated sufficient income to reestablish even a small 15 to 25-cow breeding herd. Borrowing capital for reentry seems even less likely given the positive yet relatively moderate returns above cash costs per cow.

A more traditional cycle may be expected after the turn of the century, according to Gustafson, as many of the major structural adjustments are completed. In the next century, the numbers are likely to be more affected by the traditional influences of expanding consumer population, consumer incomes and preferences, and prices of competing products. Today the production of beef cattle is more efficient than in previous decades, since the cows in the breeding herd are larger and produce a faster maturing, leaner feeder calf that requires less grain per hundredweight of beef produced.

— Carol Lee Morgan

Corn Belt Soil Moisture Replenished Quickly

During the long, hot summer of 1988, the Corn Belt endured severe to extreme drought conditions and searing temperatures. Corn yields plummeted throughout the Midwest (except in Nebraska, where much of the crop is irrigated). The national average corn yield fell to 84.6 bushels per acre, 29 percent below the previous year.

In the southern part of Iowa, the State that usually has the highest corn production, subsoil moisture levels dropped 12 to 14 inches below normal. "People wondered how many years would pass before the region's subsoil moisture levels returned to normal," recalls economist Dwight Gadsby of USDA's Economic Research Service.

From March 1 through September 30, 1988, the central and western Corn Belt ran 200 to 400 degree days above normal, and the eastern Corn Belt 100 to 200 degree days above normal. Degree days measure variations above or below normal temperatures and are used to monitor the rate of crop growth and development.

"Weather data going back to the 1890's, however, show that the Nation has never suffered widespread, severe, consecutive droughts," says meteorologist Jeffrey Andresen of USDA's World Agricultural Outlook Board.

Even the major drought years of the 1930's were each separated by a year of adequate precipitation.

"Conditions did improve in 1989, with the national average corn yield reaching an estimated 116.2 bushels per acre," says ERS economist James Cole. "But subsoil moisture levels remained well below normal."

That soon changed, however. During the spring and summer of 1990, much of the Corn Belt was bathed in normal to moist conditions. "Subsoil moisture levels throughout most of the Corn Belt have been largely recharged," Andresen notes.

Parts of the upper Great Plains, however, still have long-term moisture shortages, Andresen adds.

In 1990, planting in major corn-producing areas was delayed by the cool, rainy conditions. Andresen points out, though, that it's hard to have too much water for a corn crop once it is established. Corn needs about 25 inches of water to produce normal yields.

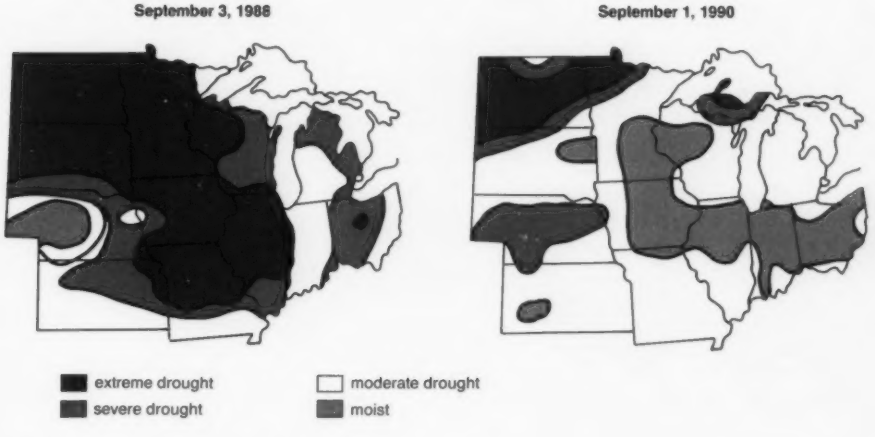
"Precipitation supplies most of this amount early in the growing season, and subsoil moisture becomes the critical source as the season progresses," he notes. "There is a strong, positive correlation between above-average rainfall and above-average yields."

Although the 1990 growing season got off to a cool start, the number of degree days in the Corn Belt was close to normal by September 30.

Cole and Andresen note that the warm weather of August and September, with temperatures well above normal, enhanced yields by accelerating development of the late planted crop. "The nationwide yield for the 1990 crop could exceed 120 bushels per harvested acre—a new record," Cole concludes.

—Priscilla Glynn

Corn Belt Moisture Levels Improved Dramatically Between September 1988 and September 1990



Based on Palmer Long-Term Drought Severity Index.
Source: NOAA/USDA Joint Agricultural Weather Facility.

REPORTS IN THE NEWS

Interactions of Farm Programs

Farm programs and other economic events have far-reaching effects on the agricultural economy, including consumers, importers, landowners, and farmers not covered by Government programs.

When an economic force shifts in one part of the agricultural economy, all parts are likely to change. Adverse weather in Asia can decrease world food supplies and increase food prices in the United States. A lower support price and less acreage reduction for corn can lower land values for other farm enterprises. An increase in farm exports can reduce domestic supplies and increase consumer food costs.

The report notes that most economic models of U.S. agriculture that examine the thrust of farm programs assume answers to questions of change in, for example, consumer and factor markets while they seek answers to change in commodity markets. Or they determine the consequences for program participants without examining the consequences for those not covered by programs, including users of program commodities such as livestock producers.

Three aspects of the agricultural economy contribute to variations in gains and losses: the relationship between feed and livestock; target prices, loan rates, and deficiency payments in program crop price determinations; and the effect of acreage reduction programs on land values.

This study examines the unintended results of income and price supports for farmers not protected by Government programs, including farmers who buy feed grains from protected enterprises.

Crops, Livestock, and Farm Programs: Overlooked Interactions, by Clark Edwards. Published September 1990; 60 pages; $11 ($13.75 to non-U.S. addresses).

The 1988 Drought And Farm Finances

The 1988 drought was the most severe since 1936 for the Corn Belt, the Northern Plains, and the Southeast regions. Federal disaster relief was provided. About 70 percent of Federal crop damage payments and 40 percent of livestock feed disaster payments went to nine States.

Those States were Illinois, Iowa, Indiana, Minnesota, Michigan, Wisconsin, North Dakota, South Dakota, and Montana. According to the Weather Service's Palmer Index (also known as the Drought Severity Index), almost every county in those States suffered severe or extreme drought.

Net farm income dropped in those States—identified in this report as the "drought region"—while rising elsewhere in the Nation. However, farms in both the drought region and the rest of the country continued to improve their solvency positions (measured by debt/asset ratio).

The Disaster Assistance Act of 1988 provided that producers of commercial crops who lost 35 percent or more of their 1988 crop were eligible for disaster payments. Eligible livestock producers included those in declared livestock emergency areas who suffered substantial losses in livestock feed normally produced on their farms. By the end of August 1989, disaster payments of $3.4 billion had been disbursed to farms.

This study evaluates the effects of the 1988 drought on farm finances. The analysis is limited to commercial farms, defined as those receiving at least $40,000 in gross income from farm operations or with $40,000 or more in farm expenses.

Effects of the 1988 Drought on Farm Finances, by Gerald W. Whittaker. Published August 1990; 12 pages; $4 ($5 to non-U.S. addresses).

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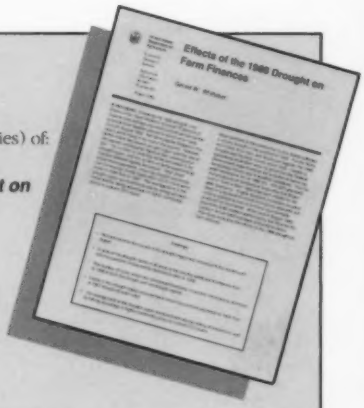

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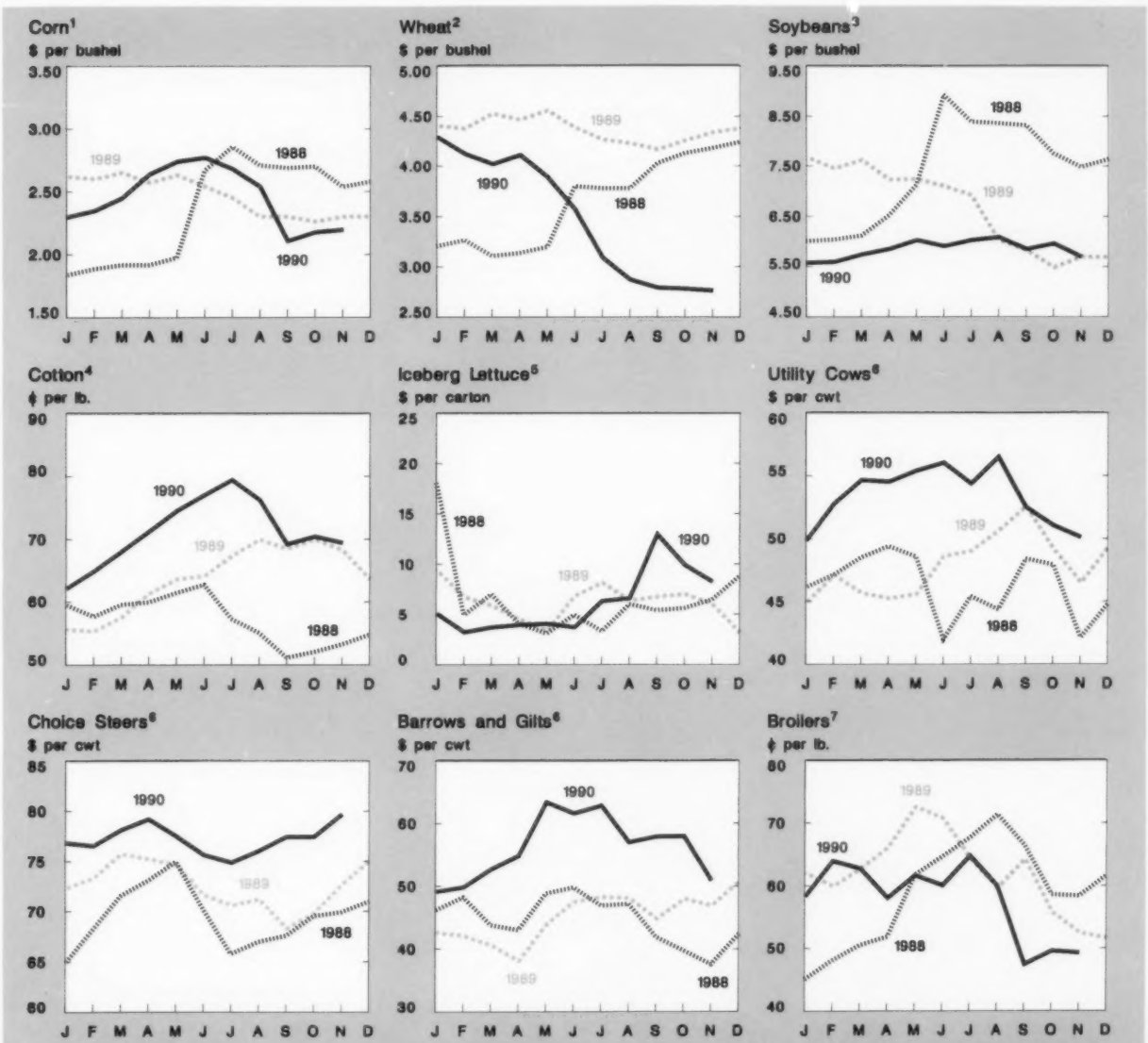
Monthly Price Monitor

USDA's November 1990 inflation-adjusted index of farm prices decreased 0.7% from October and was 1.4% below its year-earlier level. Corn inched up 2 cents to $2.20 per bushel, while wheat fell 2 cents to $2.76 per bushel. Soybeans lost 27 cents to $5.69 per bushel, the lowest since last February. Cotton held steady at 69.5 cents per pound. Lettuce, at $8.26 a carton, commanded high averages for the third month in a row. Among meat animals, utility cows continued to slide to $50.11 per cwt, their lowest since last January. Choice steers climbed to a record high of $79.72 per cwt. Barrows and gilts lost more than $7 to $50.99 per cwt. Broilers held fairly steady at 49.3 cents per pound.



[1]No. 2 yellow, Central Illinois. [2]No. 1 HRW, Kansas City. [3]No. 1 yellow, Central Illinois. [4]SLM 1-1/16", spot market price. [5]Standard carton 24's, California-Arizona. [6]Omaha. [7]Wholesale, New York. All prices shown are monthly averages.

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